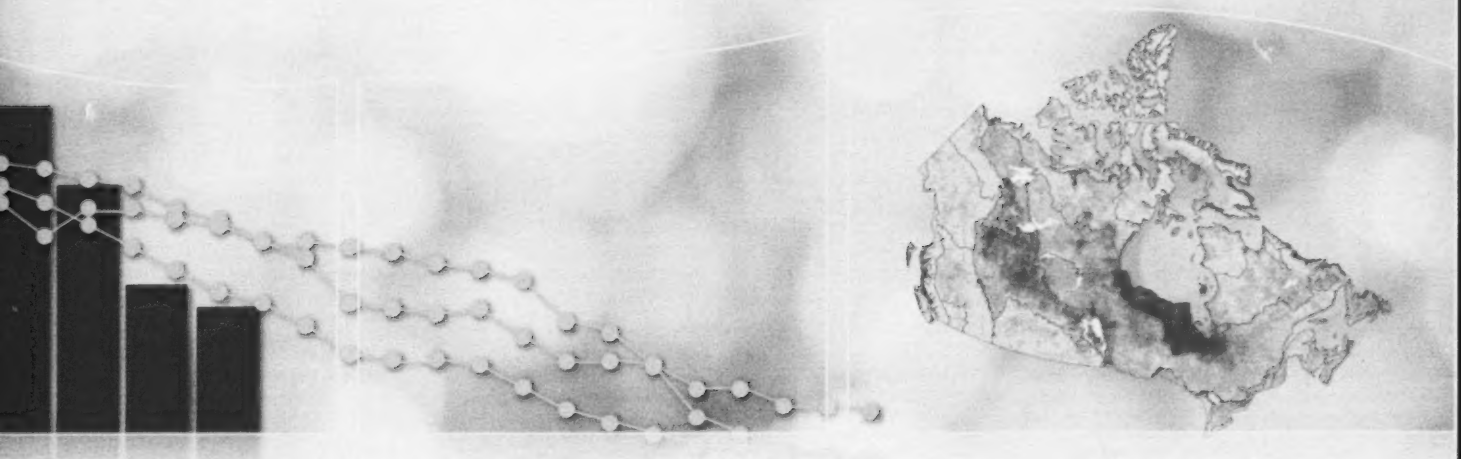
Environment and Climate Change Canada
Environnement et Changement climatique Canada

Canadian Environmental Sustainability Indicators

Marine pollution spills



Canada

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Environment and Climate Change Canada
Public Inquiries Centre
12th floor, Fontaine Building
200 Sacré-Coeur boul.
Gatineau, QC K1A 0H3
Telephone: 1-800-668-6767 (in Canada only) or 819-938-3860
Fax: 819-938-3318
Email: ec.enviroinfo.ec@canada.ca

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Canadian Environmental Sustainability Indicators

Marine pollution spills

July 2018

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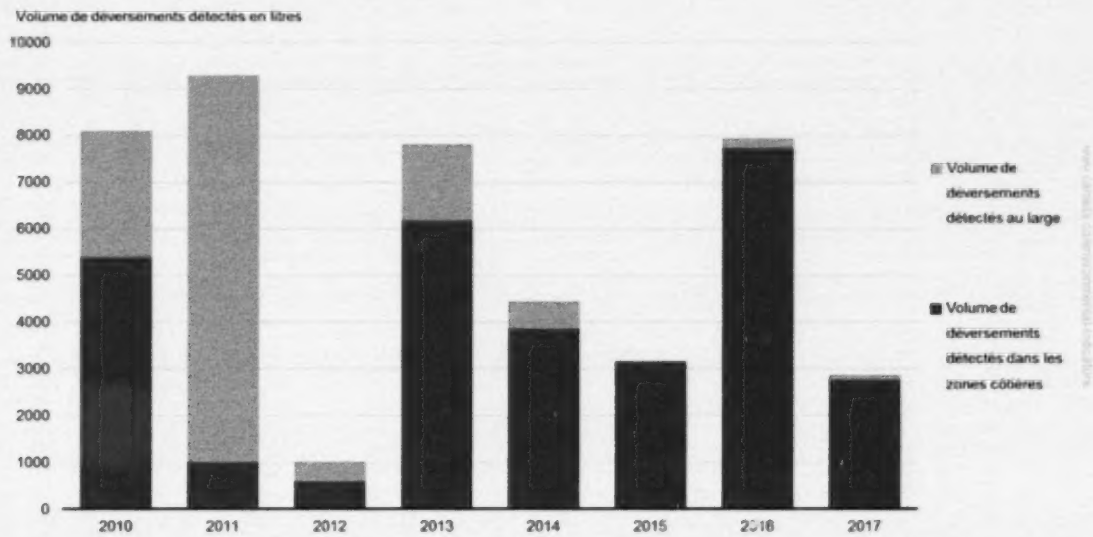
Marine pollution spills

The Government of Canada actively monitors ships in Canadian waters to help prevent pollution in our oceans and coasts as significant marine pollution spills can have long-term negative environmental and economic consequences. This indicator reports the volume and counts of marine pollution spills detected by aerial surveillance.

Key results

- From 2010 to 2017, the volume of marine pollution spills was typically greater in coastal areas than in offshore areas
- The volume of spills detected offshore has decreased since 2010
- Offshore spills have accounted for less than 2% of all detected spills since 2015

Figure 1. Volume of marine pollution spills detected offshore and in coastal areas from aerial surveillance, Canada, 2010 to 2017



Data for Figure 1

Note: Year refers to fiscal year, which runs from April 1 to March 31. The year 2017 therefore refers to April 1, 2016 to March 31, 2017.
Source: Transport Canada (2017) Marine Safety and Security Directorate.

In 2017, the National Aerial Surveillance Program detected 2 878 litres of pollution spills in Canadian waters. Spills are mainly detected within Canada's coastal areas, including the Great Lakes. Coastal areas have higher traffic and a greater risk of accidents, such as ships running aground. An aircraft can detect spills of less than 1 litre. Most spills are small (less than 10 litres) but occur frequently.

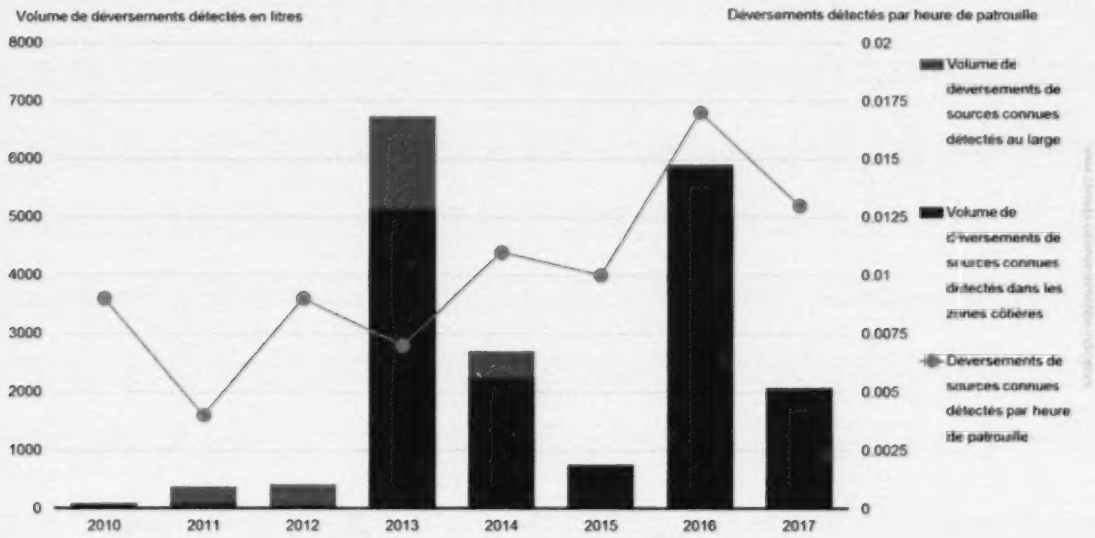
The volume of marine pollution spills varies from year to year, and a single major spill can drastically affect the total volume. The large increase observed in 2013, for example, can be attributed to 2 ship-source spills that accounted for 5 098 litres. The M/V Marathassa oil spill in 2016 accounted for 3 419 litres.

Marine pollution spills from known sources

Key results

- In 2017, 2 071 litres of spills from known sources[1] were detected, most of which occurred in coastal areas
- Between 2010 and 2017, the number of spills from known sources per patrol hour increased from 0.009 to 0.013
- Between 2016 and 2017, spills from known sources per patrol hour decreased by 24% and the volume decreased by 65%

Figure 2. Number of marine pollution spills from known sources detected per patrol hour and volume from known sources, Canada, 2010 to 2017



Data for Figure 2

Note: Year refers to fiscal year, which runs from April 1 to March 31. The year 2017 therefore refers to April 1, 2016 to March 31, 2017.
Source: Transport Canada (2017) Marine Safety and Security Directorate.

In 2017, the National Aerial Surveillance Program flew over 12 461 vessels in 2 068 patrol hours and detected 26 marine pollution spills from known sources. Twenty-four spills occurred in coastal areas accounting for the majority of spills (99.9%). Two spills occurred offshore and accounted for only 1.8 litres. Though the program acts as a deterrent for illegal dumping, accidental spills continue to occur, especially in coastal areas. The limited spills offshore suggest that the program has helped reduce illegal discharges of pollutants at sea.

The proportion of detected spills that are coming from unknown sources was previously very high (well over 95% in 2010 and 2011) while just over a quarter of spills in 2015 and 2016 were from unknown sources.

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[1] Spill refers to a hydrocarbon-based spill. Known source means that the spill can be directly linked to a vessel at the time of the observation.

About the indicator

What the indicator measures

The indicator reports the volume of marine pollution spills detected from 2010 to 2017. The indicator also presents data with respect to known sources, including volume and detections per patrol hour of aircraft surveillance. The National Aerial Surveillance Program monitors ships transiting waters under Canadian jurisdiction. The information gathered is used to enforce the provisions of Canadian legislation applicable to illegal discharges from ships.

Why this indicator is important

The indicator provides an understanding of how active surveillance impacts the occurrence of marine pollution spills. Spills come from ship operations, intentional dumping and accidents. Aerial surveillance is widely adopted worldwide and is considered to be the most effective method for detection of marine pollution spills. The presence of surveillance aircraft acts as a deterrent by discouraging illegal discharges of pollutants at sea.

Canada has the world's longest coastline, with 243 000 kilometres along the Pacific, Arctic and Atlantic oceans, as well as the Great Lakes. Canada also has some of the most difficult waters to navigate due to extreme conditions, strong currents and frigid waters. Marine activity is growing in Canada, with total tonnage of cargo handled by Canada's port system increasing by 1.3% per year between 2006 and 2016.[2]

Most spills are small but over time, with many small spills, there are potential impacts on the marine environment. A large spill can lead to long-term environmental and economic consequences. The harm to the marine environment includes effects on fisheries, wildlife and recreation.

Related indicator

The Monitoring disposal at sea indicator shows if marine disposal activities have an environmental impact.

Healthy coasts and oceans

This indicator supports the measurement of progress towards the following 2016–2019 Federal Sustainable Development Strategy long-term goal: Coasts and oceans support healthy, resilient and productive ecosystems.

[2] Transport Canada (2016) Transportation in Canada 2016 - Statistical Addendum. Retrieved on May 4, 2018.

Data sources and methods

Data sources

Transport Canada's Marine Safety and Security Directorate oversees the National Aerial Surveillance Program (the program) and compiles the data.

The indicator includes data from 2010 to 2017. All data is compiled by fiscal years, meaning April to March. For example, the year 2017 refers to April 1, 2016 to March 31, 2017. Data are gathered at the end of each month and analyzed by surveillance analysts at Transport Canada. Ship-source spills also include spills from oil rigs. Coastal areas refer to both areas which extend 12 nautical miles from coastal baselines and the Great Lakes.

More information

The program monitors ships transiting waters under Canadian jurisdiction. Evidence gathered by the program is used to enforce legislation applicable to illegal discharges from ships.

The program's aerial surveillance fleet consists of 3 specialized aircraft located across the country. They monitor shipping activities in all regions of Canada.

Aircraft contracted by other government departments are also used for surveillance. Through an agreement with the Department of Fisheries and Oceans, Transport Canada uses Provincial Airlines Limited aircraft for pollution patrols over waters off Newfoundland and Labrador.

Transport Canada also uses satellite surveillance from Environment and Climate Change Canada's Integrated Satellite Tracking of Pollution program to detect illegal discharges at sea. It searches for oil-like signatures (anomalies) on the ocean's surface. This information helps direct the program's aircraft to locations of potential spills in near real time. The aircraft crew then examines anomalies to confirm if oil is present, identify the source if possible and gather evidence for prosecution.

Surveillance data gathered by the program serve many additional purposes beyond marine pollution spills detection, including ice patrol, bird and whale surveys, marine security, environmental enforcement and awareness.

Transport Canada regulations and standards, under the Canada Shipping Act, 2001 and the Arctic Waters Pollution Prevention Act, combined with international conventions and standards established by the International Maritime Organization, provide the framework for the department's comprehensive marine safety, pollution prevention, enforcement and oil spill preparedness and response programs.

Methods

Data on spill volume and counts were taken directly from the program.

For the number of spills detected, a ratio was calculated to account for the differing surveillance effort each year. From 2010 to 2017, the number of spills detected was divided by the number of patrol hours annually.

Caveats and limitations

The indicator provides the volume and count detected by the National Aerial Surveillance Program. The data are collected for enforcement and deterrence purposes and are focused on commercial vessels. As a result, not all marine pollution spills are accounted for in this indicator.

The volume of spills detected was not corrected for surveillance effort, as there is no way to differentiate the chance of detecting a large or small spill in a given hour of surveillance. Major accidents can cause large variations in the volume of spills each year, making it difficult to detect annual trends.

Resources

References

Transport Canada (2014) Report to Parliament 2006-2011 - Marine Oil Spill Preparedness and Response Regime - TP 14539. Retrieved on February 11, 2018.

Related information

Environmental Response Systems

International Convention for the Prevention of Pollution from Ships (MARPOL 73/78)

International Convention on Oil Pollution Preparedness, Response and Cooperation (OPRC 90)

National Aerial Surveillance Program

National Oil Spill Preparedness and Response Regime

Annex

Annex A. Data tables for the figures presented in this document

Table A.1. Data for Figure 1. Volume of marine pollution spills detected offshore and in coastal areas from aerial surveillance, Canada, 2010 to 2017

Year	Volume of spills detected in coastal areas (litres)	Volume of spills detected offshore (litres)	Total volume of spills detected (litres)
2010	5 396	2 714	8 110
2011	1 001	8 294	9 295
2012	597	417	1 014
2013	6 172	1 642	7 813
2014	3 857	596	4 453
2015	3 146	27	3 173
2016	7 731	211	7 942
2017	2 775	103	2 878

Note: Year refers to fiscal year, which runs from April 1 to March 31. The year 2017 therefore refers to April 1, 2016 to March 31, 2017.
Source: Transport Canada (2017) Marine Safety and Security Directorate.

Table A.2. Data for Figure 2. Number of marine pollution spills from known sources detected per patrol hour and volume from known sources, Canada, 2010 to 2017

Year	Number of vessels over-flown	Patrol hours	Number of spills from known sources	Spills from known sources detected by patrol hour	Volume of spills detected in coastal areas from known sources (litres)	Volume of spills detected offshore from known sources (litres)	Volume of spills from known sources (litres)
2010	11 262	2 274	21	0.009	87	0	87
2011	12 365	2 506	11	0.004	82	292	374
2012	12 032	2 064	18	0.009	50	365	415
2013	10 134	2 080	14	0.007	5 143	1 592	6 735
2014	19 989	3 877	44	0.011	2 249	445	2 694
2015	19 551	3 842	37	0.010	760	0	760
2016	17 427	2 932	50	0.017	5 871	41	5 913
2017	12 461	2 068	26	0.013	2 069	2	2 071

Note: Year refers to fiscal year, which runs from April 1 to March 31. The year 2017 therefore refers to April 1, 2016 to March 31, 2017.
Source: Transport Canada (2017) Marine Safety and Security Directorate.

Additional information can be obtained at:

Environment and Climate Change Canada
Public Inquiries Centre
12th Floor, Fontaine Building
200 Sacré-Coeur boul.
Gatineau, QC K1A 0H3
Telephone: 1-800-668-6767 (in Canada only) or 819-938-3860
Fax: 819-938-3318
Email: ec.enviroinfo.ec@canada.ca